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Direct relation between Fresnel's interface reflection coefficients for the parallel and perpendicular polarizations: erratum 2

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The record is set straight concerning two equations that determine the reflection phase shifts at a single interface from the intensity reflectances for p- and s-polarized light at one angle of incidence. These equations appeared previously in this journal [J. Opt. Soc. Am. **69,** 1007 (1979); erratum, J. Opt. Soc. Am. **70,** 261 (1980)].

Previously in this journal[1] I presented equations that determine explicitly the phase shifts δ_p and δ_s that a monochromatic plane wave of light experiences on reflection at the planar interface between an isotropic transparent medium of incidence and an isotropic absorbing medium of refraction for the linear polarizations parallel (p) and perpendicular (s) to the plane of incidence in terms of the corresponding intensity reflectances R_p and R_s, as measured at one angle of oblique incidence ϕ. In particular, in Ref. 1, Eq. (18) gives δ_s, and Eq. (20) then gives $\Delta = \delta_p - \delta_s$. A subsequently published erratum[2] changed both equations. The objective of this note is to indicate that the originally published version of Eq. (18) (in Ref. 1) is correct and that the amended version of Eq. (20) (in Ref. 2) is the correct one. For ease of reference the correct equations are reproduced here:

$$\cos \delta_s = \frac{(R_s^2 - R_p) + R_s(1 - R_p)\cos^2 2\phi}{2R_s^{1/2}(R_s - R_p)\cos 2\phi}, \tag{18}$$

$$\tan \Delta = \frac{R_s^{1/2} \sin \delta_s \sin^2 2\phi}{R_s^{1/2} \cos \delta_s(1 + \cos^2 2\phi) - (1 + R_s)\cos 2\phi}. \tag{20}$$

I am grateful to F. J. J. Clarke for alerting me to the correct forms of these equations.

REFERENCES

1. R. M. A. Azzam, "Direct relation between Fresnel's interface reflection coefficients for the parallel and perpendicular polarizations," J. Opt. Soc. Am. **69,** 1007–1016 (1979).
2. R. M. A. Azzam, "Direct relation between Fresnel's interface reflection coefficients for the parallel and perpendicular polarizations: erratum," J. Opt. Soc. Am. **70,** 261 (1980).

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